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CEREAL AND FORAGE INSECTS

New southern limit for Hessian fly parasite.---Chas. C. Hill, of the Hessian fly laboratory, Carlisle, Pa., reports that "A female of Pleurotropis epigonus Walk. was reared in 1932 from a Hessian fly puparium collected at Wytheville, Va., a new and interesting record of the dispersion of this chalcidoid. P. epigonus was introduced from England under the instigation of C. V. Riley and F. M. Webster in 1891. In 1921 a careful review by J. S. Wade and P. R. Myers of all distributional records of this parasite gave only one record of its occurrence in Virginia---Shenandoah County * * * the most southern distribution it was then known to have. Since then one male has been reared from Mt. Ross, in Westmoreland County, and one female from Wytheville, over 100 miles farther south."

Parasite of sugarcane mealybug survives freezing temperatures.---H. A. Jaynes, Houma, La., reports that "Breeding of Pseudococcobius terryi (Full.)," recently introduced from Hawaii, "was continued in the laboratory. A vial containing mealybugs collected from Southdown plantation on December 20, 4 days after the freeze when the temperature dropped to 24.5°F., produced 8 parasites on January 21. * * * this freeze did not kill the parasite in the field."

Relative effectiveness of grasshopper baits.---In a series of cage tests that are being conducted on the effectiveness of different poisoned-bran baits on young hoppers, R. L. Shotwell and F. A. Morton, Bozeman, Mont., have found that "When sodium arsenite was used as the poison ingredient there was no significant difference between cane molasses, beet molasses, or amyl acetate used by themselves. All three were much better (22 percent to 34 percent mortality) than just the bran, sodium arsenite, and water. Amyl acetate in combination with cane molasses added very little (2.4 percent mortality) to the attractiveness of the bait. However, it increased the effectiveness of the beet molasses by about 8 per cent mortality. In some of the baits sodium fluosilicate was used as the toxicant at the rate of 2 1/2 pounds and 5 pounds per 100 pounds of bran (dry weight). Here the 2 1/2 pounds alone was better (14 percent) than sodium arsenite alone. The 5-pound bait of so-

dium fluosilicate alone was equal to the sodium arsenite mixtures of cane molasses, beet molasses, and amyl acetate."

Parasitization of fall generation of Hessian fly in Kansas.--Reporting on the fall survey of Hessian fly parasites, J. R. Horton, Wichita, Kans., says that the examinations "indicated an average parasitization of only 2 percent for the entire (western hard wheat) region with Platygaster hiemalis Forbes the only parasite species present. In the order of intensity of parasitization, southeast Nebraska led with 16 percent; northwest Missouri was next with 9 percent; southeast Missouri, 5 percent; northwest Kansas, 4 percent. Less than 1 percent of the puparia from all other State sections were parasitized, while those from Oklahoma had no parasitization whatever. The state averages were: Missouri, 2 percent; Kansas, 1 percent; Nebraska, 6 percent."

Hessian fly parasite has numerous alternate hosts.--Mr. Hill also reports a list of 26 hosts of Eupelmus allynii (French), other than the Hessian fly, 7 of these being themselves parasites of the fly, showing that as to these 7 E. allynii plays the rôle of hyperparasite. The hosts are as follows:

Cephus cinctus Nort.
Cephus pygmaeus L.
Eurytomacheris eragrostidis How.
Harmolita atlantica Ph. & Em.
Harmolita elymicola Ph. & Em.
Harmolita grandis Riley
Harmolita maculata How.
Harmolita tritici Fab.
Harmolita vaginicola Doane

Languria mozardi Lat.
Mompha eloisella Clem.
Neolasioptera sp. (dipterous gall)
Oecanthus quadripunctatus Beut.
Oscinid puparium
Procystiphora n. sp.
Tischeria malifoliella Clem.
Trachelus tabidus Fab.

Parasitic Hosts

Ditropinotus aureoviridis Cwfd.
Eurytoma sp.
Homoporus chalcidiphagus Walsh
Merisus destructor Say

Platygaster vernalis (Myers)
Pleurotropis epigonus (Walk.)
Tetrastichus carinatus Forbes

COTTON INSECTS

Cotton flea hopper headquarters transferred.--On January 15 the headquarters for cotton flea hopper investigations, formerly located at Tullulah, La., were transferred to Port Lavaca, Tex. The actual moving took place on January 17 to 19, inclusive.

Farmers anxious to cooperate in cotton flea hopper research.-- "There seems to be an unusual amount of interest in this locality" reports K. P. Ewing, Port Lavaca, Tex., "concerning our cotton flea hopper investigations. We have been approached by numerous planters and individual farmers who offered their entire farms, or any portion of them, for any field experiment we may wish to conduct. We are well pleased with the apparent cooperation that we will have here in conducting our experiments."

Little winter activity of boll weevil in Oklahoma.--H. C. Young, Eufaula, Okla., reports that "Daily observations were made throughout the month (January) of the 70 hibernation cages installed last fall. During the month only 3 active weevils were observed; 1 on January 18, 1 on January 19, and 1 on January 22. These active weevils were in the cages installed on October 15, 1932. Two were observed in the cages provided with corn stalks as hibernation shelter and 1 in a cage provided with prairie hay. Even though the weather was unusually warm for this period of the year there was no marked tendency for the weevils to emerge from the material in the hibernation cages and crawl about on the wire."

Merits of different methods of collecting pink bollworms for parasite breeding.--L. W. Noble and L. C. Fife, Presidio, Tex., reporting on methods of obtaining pink bollworms for the breeding of the parasite Microbracon brevicornis Wesm., state: "Part of the larvae in the cotton bolls collected in the fall spun up in the lint and the others inside the seed. When needed for parasite breeding, the larvae can be obtained by tearing the lint apart by hand and cutting the seed with a knife. This method would be rather slow for collecting a large number of larvae. Many of the larvae are injured in cutting the seed, but the uninjured ones cut out in January were in almost as good condition for parasite breeding as larvae collected in the growing season. This method, although slow and tedious, is believed to be preferable for parasite breeding to other methods principally used in biological work on the pink bollworm. It was found that the most successful method of securing overwintered pink bollworms in abundance for biological work in the spring was to soak infested seed in water and let the seed heat. The larvae became active, crawled out of the seed, and began pupation. This was desirable for the biological work but most of the worms were not in the best stage for parasite development. It has been observed in the laboratory that pink bollworms parasitized just before pupation began to decay after a few days and the parasite larvae died. Evidently the body content of the host at that stage was not suitable food for the parasites."

INSECTS AFFECTING MAN AND ANIMALS

Ditch construction important in sand-fly control.--W. E. Dove and assistants, Savannah, Ga., who have been making studies of sand-fly larvae, report that "the storm tides of last autumn reduced the incidence

of sand-fly larvae in ditches traversing open marshes and in those ending in open marshes. The records suggest that the reduction in numbers of larvae in good ditches was permanent. They show that the blind ditches terminating in the open marshes are now receiving increased numbers of larvae. Since the storm tides, the normal high tides are returning larvae from the open marshes to the blind ditches. * * * The studies on ditches emptying into running streams at Fort Pierce give good evidence on efficacy of properly constructed ditches. On the other hand, the evidence obtained at Savannah and Charleston gives evidence that ditches terminating in the open marshes are not effective in permanently dispatching sand-fly larvae. From the open marshes the larvae return with high tides to the blind ditches and depressions. The evidence obtained leaves little or no doubt that larvae travel over open marshes and that they go with the tides."

Viability of eggs of horse botfly.--R. W. Wells, Ames, Iowa, reports that of 2,200 eggs of Gastrophilus intestinalis DeG. collected from horses in the vicinity of Columbia, Mo., January 17 and 18, 3.9 percent were viable and that of 1,300 eggs collected from horses at Ames January 2, 4.15 percent were viable.

Effective dips for goat lice.--O. G. Babcock, Sonora, Tex., reports that 100 per cent control of goat lice was obtained when "the entire station flock of goats, 570 head, were dipped October 7 and 17 in the following formula:

Wettable thylox flotation sulphur.....	10 pounds
Linseed oil soap.....	25 ounces
Sodium phosphate tribasic.....	25 ounces
Water.....	100 gallons

He states that the entire flock appeared to be free of all lice at time of second dipping and that these results corroborate results of similar work in 1930. He states further that "The goats in one pen were dipped on April 13, 1932, in thylox wettable sulphur, 2 pounds to 100 gallons of water plus 25 ounces each of linseed oil soap and sodium phosphate tribasic. These goats are still 100 percent clean after a period of 281 days following a single dipping."

STORED PRODUCT INSECTS

Survival of dried fruit beetle under water.--"In order to obtain information about the resistance of adults of Carpophilus hemipterus L. to submersion by irrigation water or winter rains," Dwight F. Barnes, Fresno, Calif., "made tests at outdoor temperatures which were below 50°F. Survivals of 88 percent after submersion for 24 hours (5 tests), of 80 percent after 48 hours (5 tests), and 73 percent after 72 hours (5 tests) were recorded. One test showed a survival of 37 percent after 91 hours, but 3 tests of 96 hours' submersion resulted in complete mortality."

Delay in picking up figs increases moth infestation.---"Considering Ephestia infestation alone," reports Perez Simmons, Fresno, "the records show that twice-weekly gatherings of Adriatic figs resulted in an infestation by Ephestia of 2.6 percent; weekly pickings, 3.7 percent infestation; and picking up every 10 or 11 days, 11.6 per cent infestation. These results support our recommendation that figs should be picked up as frequently as possible and at least once a week."

Use of shade-cloth drying yards--cost vs. returns.---Mr. Simmons submits detailed figures to support his estimate (see December Monthly Letter) as to the cash value of shade cloths for drying figs. He says: "Assuming that the figs (in the experimental orchards) were sold orchard run, those dried under cloth would have brought about \$36 per ton this year and the others about \$15, a difference of \$21 per ton. If sorting had been done, the figs dried under shade cloth would have been brought up to 90 percent good, worth \$40 per ton; and, at a liberal estimate, the figs dried on exposed trays would have tested 80 percent good after sorting, worth \$27 per ton. In other words, an expenditure of \$1.50 per ton for material, and possibly an equal amount for extra labor--total \$3--would have brought gross returns of \$13 per ton above what was hypothetically receivable for the figs dried in the usual manner, or a net advantage of \$10 per ton."

TOXICOLOGY AND PHYSIOLOGY OF INSECTS

N. E. McIndoo, Takoma Park, Md., states that the heading for paragraph 1, page 6, in the January 1933 Monthly Letter should have been: Tarsi of flies do not carry gustatory organs.

BEE CULTURE

Efficiency in apiary management.---Reporting further on the cooperative study of apiary organization and management, mentioned in the December Monthly Letter, George E. Marvin, Somerset, Md., says: "It appears more profitable to follow the plan of putting down into the brood nest combs of honey from the supers above and to save out full combs of honey to feed in the spring than to buy sugar, make up sirup, and feed in fall and spring. None of the cooperators who had to feed their colonies to keep them alive had an absolute crop failure. In 1930, the cost of sugar alone for 16 cooperators amounted to \$3,598.97 and in 1931 for 13 cooperators to \$1,816.47. In order to pay the sugar bill alone a large quantity of honey had to be extracted, tanked, pailed, and marketed. It seems a waste of time to go to all this trouble when combs of honey can be saved from the early crop for fall and spring feeding."

FRUIT AND SHADE TREE INSECTS

Automatic collection of grain moths for rearing Trichogramma.---Herbert Spencer and Luther Brown of the Albany, Ga., laboratory, have been experimenting with various methods of collecting the Angoumois grain

moth (Sitotroga cerealella Oliv.) used in the rearing of the parasite Trichogramma minutum Riley. They report as follows: "Early in January an automatic system of moth collection, similar to that used in Canada by Mr. Baird, has been tested in this laboratory, with surprisingly good results. In the four corners of the flat metal tops of our cabinets we cut circular holes and over these holes soldered large tin funnels, with the spouts pointing up. For collecting over these funnels, tin coffee cans were fitted with similar funnels in the lids and with screen-wire bottoms. These trap cans were inverted so the funnels on the tops of the cans fitted over the funnels on the unit (cabinet) top. Regular collections once a day yielded more moths from the units than were formerly obtained in a single collection each day with the vacuum sweeper collector, and the moths lived and laid eggs longer, as they were not injured by suction. It is believed that by using wheat in unit cabinets with vertical trays, and with automatic collectors as described above, the cost of rearing Sitotroga and Trichogramma will be reduced to an astonishingly low figure."

Bands catch large percent of codling moth larvae.---Fred P. Dean of the Yakima, Wash., laboratory, reports: "In order to find out the percentage of the larvae that have left the apples by harvest and are caught in beta naphthol treated bands, 7 Jonathan and 8 Winesap trees were banded early in the season. All the apples from each tree, including the dropped fruit, were carefully examined and the number of worms that had left the apples was recorded and checked against the number of worms found in the bands. Of 730 worms that had left the fruit on Jonathan trees 62 percent were caught in the bands, whereas of 231 worms from the Winesaps 88 percent were caught, the average for the two varieties being 68 percent. Similar banding tests in 1931 resulted in catches of 32 percent for the Jonathans, 37 percent for the Winesaps, and an average of 35 percent for both. The higher percentages obtained in 1932 may have been caused by the owner's failure to remove wormy apples from the orchard."

Fermenting baits most attractive to oriental fruit moths.---In summarizing a detailed report on the relation of fermentation to attractiveness of bait traps to the oriental fruit moth (Grapholitha molesta Busck), W. P. Yetter and L. F. Steiner, of the Cornelia, Ga., laboratory, state: "The records show that in most baits there is a correlation between fermentation and attractiveness, with the latter increasing or decreasing as the rate of fermentation increases or declines. Efficiency is affected not so much by the total fermentation as by the presence or absence of it. As fermentation and degree of attractiveness are not uniform at all ages, it appears that if a single bait is to be used commercially it must be maintained at two ages throughout the orchard for best results."

Sulphur residue toxic to newly hatched purple scale.---R. L. Miller and Mrs. Ione Pope Bassett, Orlando, Fla., report as follows: "On October 29, 1932, several small nursery citrus trees were sprayed with various concentrations of lime-sulphur solutions. One analysis of the sulphur residue was made immediately after spraying and another two months later, when the experiment was terminated. Immediately after spraying, leaves

heavily infested with purple scales were attached to 50 of the sprayed leaves by means of paper clips. Two months afterward all the leaves to which infested leaves had been fastened were picked and the dead and living purple scales present were counted. The results are shown in the following table:

Lime-sulphur concentration	Sulphur residue per kilogram of leaves			Leaves counted	Scales counted	Living scales percent	Average scales per leaf
	10/29	12/29	Average				
	Grams	Grams	Grams	Number	Number	Percent	Number
1-25.....	2.66	0.48	1.57	20	304	13.4	2.0
1-40.....	1.46	.53	.99	20	135	28.0	1.9
1-60.....	1.35	.32	.83	20	186	51.0	4.7
Check.....	--	--	--	20	166	76.0	6.6

Iron-oxide and lead-oxide dust effective against the citrus rust mite.—W. W. Yothers and associates at Orlando report further on the use of iron oxide in the control of Phyllocoptes oleivorus Ashm.: "Leaves dusted with iron oxide and lead oxide were brought into the laboratory and other leaves heavily infested with rust mites were attached to them. At the end of two days when the infested leaves had wilted, the number of mites on the dusted leaves were counted, 25 half-inch circles being counted on the upper and 25 on the lower surfaces of each plot. * * * When the mites were examined under the microscope with the oxide on them it was found that none were able to retain their hold on the leaf. They held to the oxide particles and when these particles fell from the leaf, the mites fell with them. Another experiment was tried in which the iron oxide was sprayed on as iron hydroxide and in this case it stuck tight to the leaves like varnish. When mites were introduced on this they were able to remain as shown below:

	Circles counted	Mites present	Average mites per half-inch circle
	Number	Number	Number
Iron oxide, smooth on leaf.....	41	22	0.53
Check.....	44	22	.50

These results indicate that the effect of iron oxide in controlling mites is entirely mechanical. When the iron-oxide particles are loose and roll off easily they carry the rust mites with them, and when the iron sticks tight the mites are able to establish themselves."

JAPANESE BEETLE AND ASIATIC BEETLE RESEARCH

Paradichlorobenzene as a soil fumigant for Jap beetle.—Reporting on experiments to determine the value of paradichlorobenzene for the destruction of immature stages of the Japanese beetle in the soil about the roots of balled nursery stock and potted plants, J. W. Lipp, Moorestown, N. J., says: "Dormant roots of several varieties of perennials,

previously infested while in storage, were treated by covering with soil containing 10 pounds of paradichlorobenzene per cubic yard. After a week the roots were torn apart and examined. In Coreopsis lanceolata and Artemisia lactiflora all larvae were dead. In Monarda rosea, Boltonia latistquama, and clumps of Barr's pink aster some sick but no normal larvae were found. In clumps of Shasta daisy 3 percent of the larvae were normal. All the clumps, however, were large, some being 8 to 10 inches in diameter, and a prolongation of the treatment or a higher dosage would probably have given a complete kill. * * * In another test, dormant roots of some of the above mentioned varieties were potted in soil containing paradichlorobenzene at the rate of 5 pounds per cubic yard. An incomplete kill was obtained in most cases, probably because the root clumps were so large that comparatively little of the treated soil could be put into the pots."

Control of Jap beetle in lawns and golf courses.--In January M. R. Osburn, Moorestown, obtained information relative to turf injury and control practices in 1932 from 39 golf courses in the area of heavy beetle infestation. All of the clubs visited had used lead arsenate on the greens and tees to prevent grub injury, the treatment being considered a necessary annual procedure to insure fine turf. Twenty of the 39 clubs have grub-proofed the fairways and 1 had treated the rough. Green keepers reported that the lead arsenate was applied alone as a dry powder; mixed in a top dressing; or as a spray. In most instances the material was mixed with inert ingredients and applied with a tractor-drawn drill. Grub injury to turf in the spring was reported on 10 of the 39 courses, 9 of which were damaged in the fairways and 1 in the rough. Practically all of the injury was on untreated areas, with the exception of two areas which had received applications of lead arsenate three or four years ago.

TRUCK CROP AND GARDEN INSECTS

Bulb-fly counts in narcissus bulbs.--C. F. Doucette, Sumner, Wash., who has made a study of the degree of infestation by Merodon equestris Fab. in large bulbs as compared with small ones, found the average infestation in large bulbs (double nose and larger) to be 2.54 percent greater than in small bulbs (rounds and slabs). The average infestation in the larger bulbs was 6.07 percent and in the smaller 3.53 percent.

Concerning the infestation by Eumerus spp., Mr. Doucette states that "A study of records over the 4-year period, 1928 to 1931, shows an average of 23.24 Eumerus larvae per bulb in the narcissus bulbs examined. The records cover a total of 5,577 narcissus bulbs, containing a total of 129,606 Eumerus larvae; 50 percent of the bulbs contained 10 or less larvae; and the largest number of larvae in a single bulb was 947." A 4-year study (1928-1931) of joint infestation by M. equestris and Eumerus spp. shows that 2.24 percent of the Merodon-infested bulbs were also infested with Eumerus; that 3.998 percent of the Eumerus infested bulbs were also infested with Merodon; and that the total percentage of infested bulbs carrying joint infestation was only 1.46.

Life history of lima bean pod borer affected by temperature.--Summarizing the season's notes on Etiella zinckenella Treit., Rodney Cecil, Ventura, Calif., says: "The effects of the temperature are best shown by the number of generations of the pod borer in the (last) two seasons. In 1931 there were from three to five generations, whereas in 1932 there were only two, with a possible partial third. The hibernation period in 1932 began on July 20. * * * no larvae maturing before July 20 hibernated but 12.34 percent of the larvae maturing between July 20 and July 31 hibernated. The percentage of larvae that hibernated from those that matured in successive 10-day periods steadily increased" from 12.34 percent for the period July 20 to July 31 to 100 percent for the period September 11 to November 7.

Feeding of desert lizards vs. parasitization of beet leafhopper.--George F. Knowlton, Logan, Utah, reports that "To determine frequency of internal parasitization in the leafhoppers ingested by the desert lizards, as compared with parasitization in the material taken in sweepings, 1,870 individuals taken from lizard stomachs, mostly during October, were dissected. Two Pipunculus parasites were found in the 168 adult Eutettix tenellus Bak. dissected, and only 1 Pipunculus was taken from 1,702 nymphal tenellus. This did not indicate that the lizards were taking more than the average proportion of parasitized beet leafhoppers." Mr. Knowlton reports further on lizard predators of beet leafhoppers: "In the season of 1932, 958 brown-shouldered Utas, Uta stansburiana stansburiana (B. and G.) were taken among common host plants of E. tenellus; of these, 521 contained a total of 1,311 adults and 5,824 nymphal tenellus. A total of 133 sagebrush swifts, Sceloporus graciosus graciosus (B. and G.) were taken among host plants (or other places, but contained E. tenellus); 17 contained 27 adult and 8 nymphal E. tenellus. Lizards of a few other species had fed upon beet leafhoppers, as shown by the stomach contents of at least one specimen. A large number of lizards were taken among host plants, such as sage and rabbit brush; occasionally a specimen of the smaller lizards had taken a tenellus."

Clean-up of nightshade aids in control of pepper weevil.--"The history of the occurrence of nightshade (Solanum spp.) in the pepper-growing area of Orange County is interesting," states Roy E. Campbell, Alhambra, Calif., "When the pepper-weevil investigation was started and for a few years thereafter, nightshade was very common all over the area * * * After the heavy losses from pepper-weevil damage in 1931 the growers became nightshade conscious. This year it is difficult to find perennial nightshade in some areas. The annual varieties are killed readily by light frosts. Fence rows, ditch banks, and other areas have been kept fairly clean of all weeds. * * * Nightshade is a host of the tomato pin worm and a number of other truck crop insects, and we feel that the progress made so far in its eradication along with other weeds has very decidedly lessened insect damage to truck crops in that area. A group of Japanese growers form crews who cover their particular area each winter to see that every nightshade plant is destroyed. We do not

expect to control the pepper weevil entirely by this method because the period between plowing and the first appearance of new pepper plants some seasons is very short, owing to weather conditions."

Life history of female bean beetle.--"Overwintered females of Epilachna corrupta Muls. that complete a normal life pass through five periods," reports J. R. Douglass, Estancia, N. Mex.: "Prehibernation, 21 days; hibernation, 257 days; emergence from hibernation to oviposition, 8 days; oviposition, 37 days; and postoviposition, 4 days."

FOREST INSECTS

Sex ratio of mountain pine beetle.--W. D. Bedard, Coeur d'Alene, Idaho, reports that "An examination of 4,010 adults of Dendroctonus monticolae Hopk. in the galleries of newly attacked white pine trees showed a ratio of 3 females to 2 males. However, an examination of 2,500 new adults previous to emergence from the old brood trees and after attack in the new host showed a sex ratio of 1 female to 1 male. Therefore, the matter of sex ratio need not be considered in predicting or accounting for increases of this bark beetle."

Mountain pine beetle prefers larger trees.--"To determine the extent of destruction occurring in a lodgepole pine stand owing to a mountain pine beetle infestation, a sample strip 4 1/2 miles long containing 36 acres was intensively examined on the Beverhead National Forest in 1932," reports L. G. Baumhofer, Coeur d'Alene. "The infestation has been present on the area for 6 years, is still very active, and will probably continue its destruction in the remaining stand for a number of years. The data secured by the 1932 examination indicate the comparative freedom of the smallest diameter classes from bark-beetle attack, both because of their greater resistance and the preference shown by the insect for the larger diameters. The large number of 'pitched out' attacks, i.e., the trees which have provided so copious a flow of pitch as to wash out or drown the attacking bark beetles, in the diameter classes from 5 to 9 inches indicate the vigorous resistance of trees of this size to insect attack. These unsuccessfully attacked trees are still living and it is likely that many of them will constitute a fair portion of the residual stand."

Mortality of western pine beetle.--J. A. Beal, W. J. Buckhorn, and J. M. Whiteside, Portland, Oreg., spent the greater part of January analyzing samples of ponderosa pine bark in order to determine winter mortality of broods of Dendroctonus brevicomis Lec. from forest areas in eastern Oregon and Washington. They report: "To date over 300 samples have been worked up and all living and dead larvae recorded. * * * about 60,000 insects have been examined * * * Brood mortality has varied somewhat with different areas, reflecting no doubt the differences in air temperature in different locations. Bark thickness is an important factor in modifying the degree of mortality, which is high for thin-bark trees and low for thick-bark trees." Total mortality in four localities ranged from 56 to 72 percent.

Extermination of the western pine beetle impracticable.--P. C. Johnson, Berkeley, Calif., reports progress on an experiment "planned in 1928 to try out the possibility of exterminating the western pine beetle under conditions where it is necessary for the insects coming in from outside infestations to fly several miles to reinfest the control area. The area has been worked annually for five seasons at the expense of the Bureau. Results to date show that the volume of timber killed annually by insects has remained at about the same level, regardless of control work; that the composition of the infestation has been changed from one composed primarily of D. brevicornis to one in which Melanophila, or flathead borers, predominate; and that the extent of reinfestation each year can be accounted for by the infestation missed through the technic of control work. From these results it appears that extermination is impracticable for the western pine beetle, but that its ability to maintain itself is due to faulty control methods and local conditions in the area, rather than to long flights, coming in from areas outside the control zone."

More on winter kill of western pine beetle.--J. M. Miller, Berkeley, Calif., reports further on the effects of the low temperatures of December 9 to 14, 1932, on broods of the western pine beetle. He states that on the basis of a kill of 64.4 percent "a decision was reached by the Forest Service to close down further control work, as infested trees containing two-thirds dead broods would have to be burned in order to kill the one-third of the beetle population estimated to have survived the freeze. A saving of approximately \$14,000 in private and Federal funds was made as a result of this decision, a considerable part of which can now be released for urgently needed work in other heavily infested areas. * * * One unfortunate phase of the freeze was the kill of clerid predators, which appear to have died in about the same ratio as the bark beetles."

Parasitization of gipsy moth eggs.--J. A. Millar, Melrose Highlands, Mass., reports that he "has examined gipsy moth egg clusters collected in southeastern Massachusetts, including Cape Cod, for evidence of parasitization. He submits the following figures in this connection, including for comparison the results obtained in examining eggs collected in 1931 in the same area:

Year	Egg clusters examined	Eggs exam- ined	Average eggs per cluster	Parasitization by <u>Anastatus</u> <u>disparis</u> Ruschke	Parasitization by <u>Ooencyrtus</u> <u>kuvanae</u> How.
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Percent</u>	<u>Percent</u>
1932	207	80,525	389	22.3	7.7
1931	210	97,500	464	19.4	3.1

The percentage of parasitization in these collections was considerably higher than in the collections made in 37 towns distributed throughout the infested New England area" (reported in the January Monthly Letter). "In the collections from the 37 towns parasitization by A. disparis was 14.0 percent and by O. kuvanae 1.3 percent. The average

number of eggs per cluster was 482. The fact that the average number of eggs in clusters collected this year in southeastern Massachusetts was smaller than the average for those collected in the 37 towns would in part account for the difference in parasitization since, other factors remaining the same, more of the eggs in small clusters are parasitized than in large clusters, while the difference in parasitization by O. kuvanae at least can be explained by the fact that the climatic conditions are more favorable for its increase in southeastern Massachusetts than in other parts of New England."